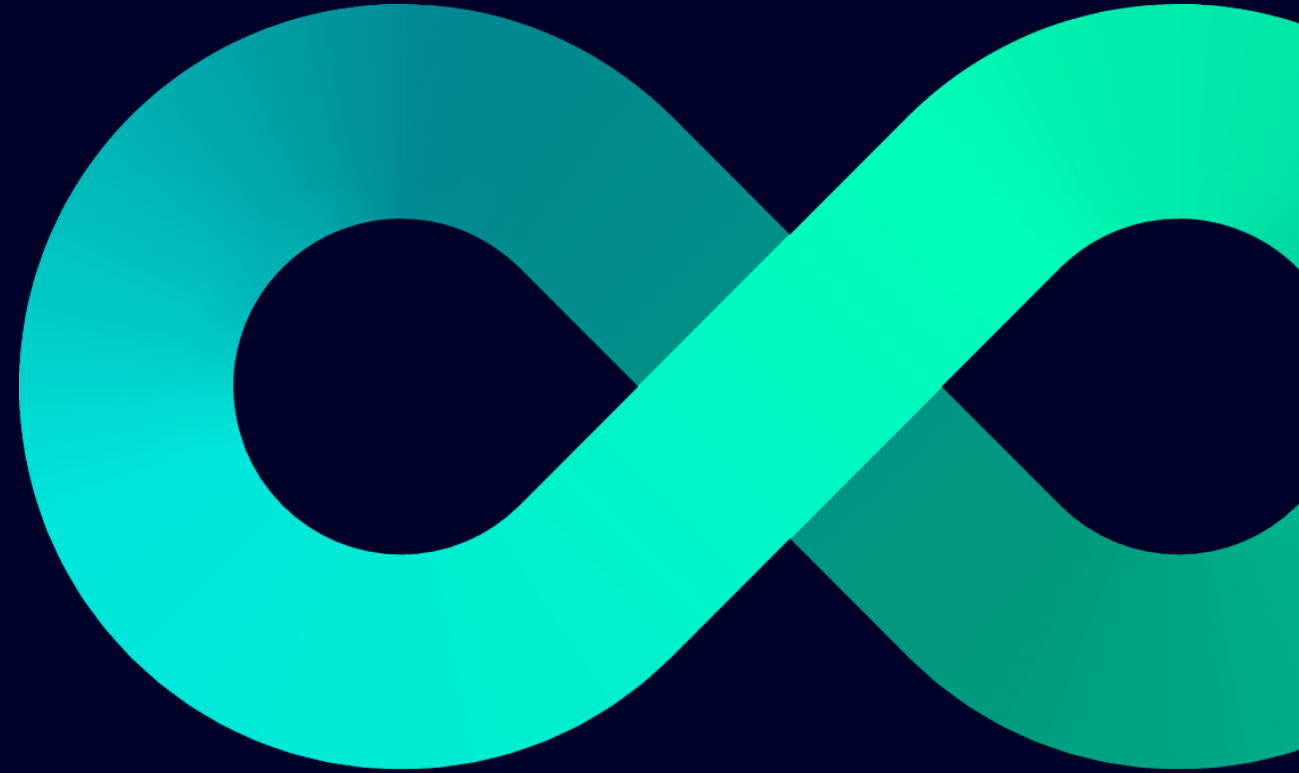


Gen AI In Manufacturing

Yan Licheng
Solution Consultant, Singapore



SIEMENS

Pushing Frontiers
Bridging Experience & Technology

1 AI must be
industrial grade

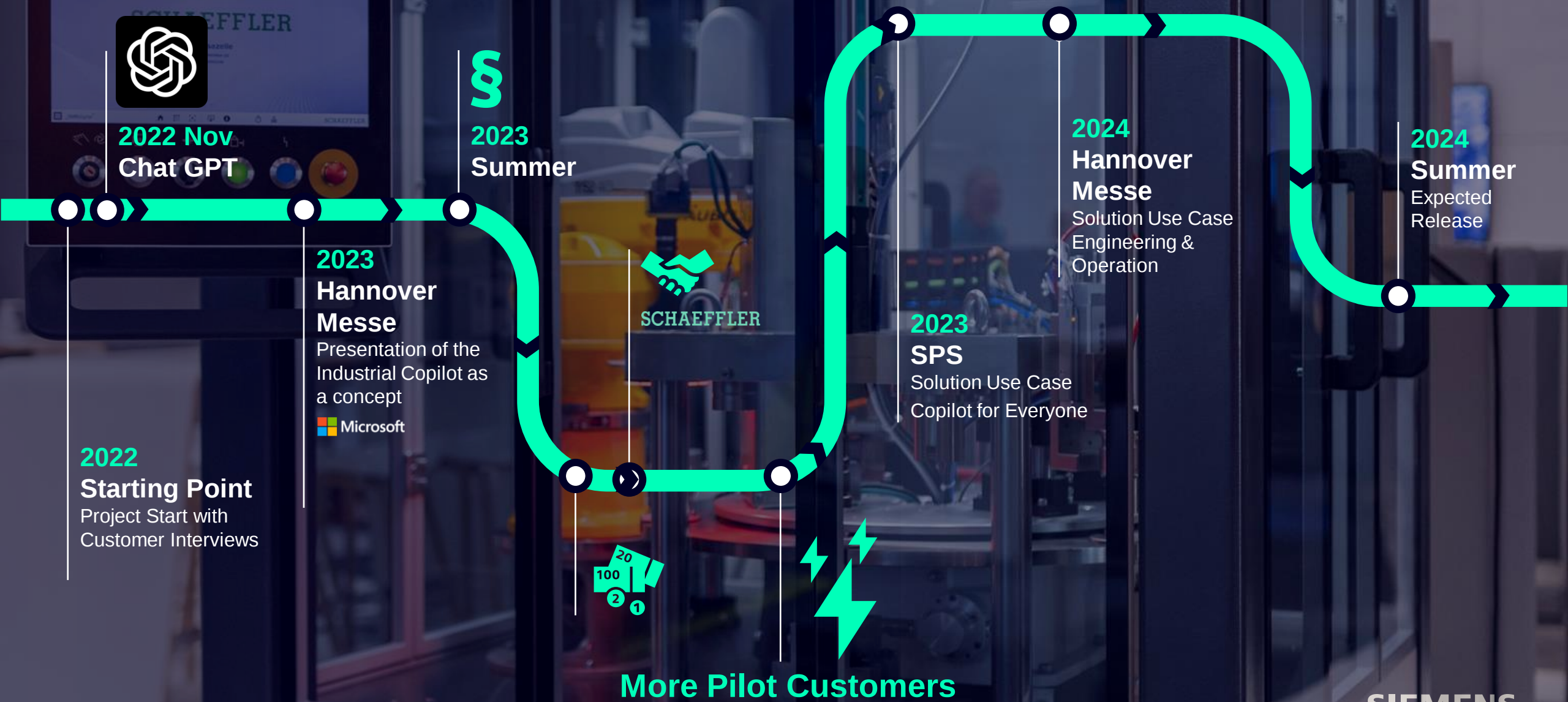
2 Industrial AI must be **accessible to all** -
the **democratization** of AI

3 Industrial AI needs **strong**
ecosystems

Siemens Industrial Copilot X Microsoft

Supporting human along Industrial value chain

Siemens Industrial Copilot



SCHAEFFLER

Messezelle

M1021K35AA.02
2102000240



Bringing Gen AI To Industry

Siemens Industrial Copilot

SIEMENS

Digital Industries
Leader in industrial software
and automation

 **Microsoft**

Technology enabler with Azure
OpenAI Services



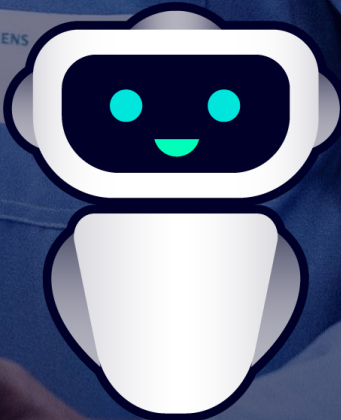
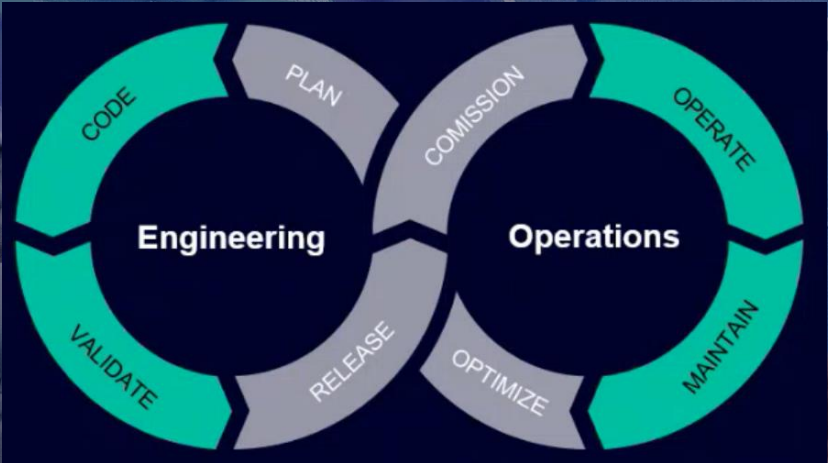
Break new ground
in creativity

Plan more efficiently than
ever before

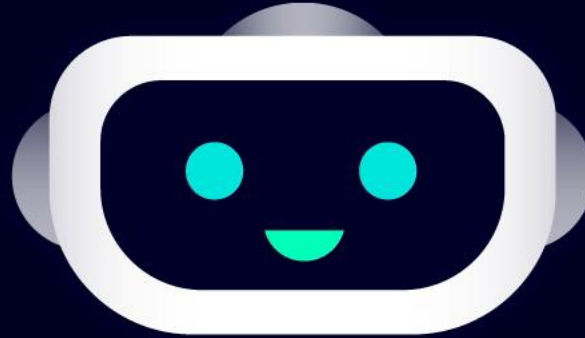
Engineering without
repetitive tasks

Transparency at
your fingertips

Know it all – before
it happens



Siemens Industrial Copilot Extending Intelligence

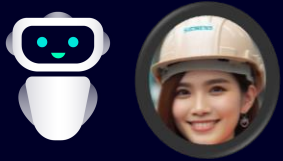


**What if you could optimize your
production by simply asking a
question?**

Industrial Copilot

A Journey

Leveraging Dynamic + Static Data



Optimization

Troubleshooting &
Repair

Shift Operations

Predictive Maintenance
Senseye

Challenge:

- Data problem, not easy to approach at first glance

Opportunities

- Extend power of data analytics to shopfloor
- Extend capabilities of each member. Collective contribution.

Siemens Industrial Copilot:

- Siemens conditioned our model on Industrial data. Prompt Eng

Industrial Copilot Optimization

Can you identify any bottlenecks in the production process?



The production process seems to have a bottleneck at Station 11. This is indicated by the negative mean value of the running difference in cycle time for Station 11, which suggests that this station is taking longer than expected to complete its tasks.

Supporting Observations:

- The mean running difference in cycle time for Station 11 is -0.000704816, which is the only negative mean value among all the stations. This indicates that station 11 is slower compared to the other stations.
- The maximum running difference in cycle time for Station 11 is 0.000698233, which is relatively high compared to other stations. This suggests that there are instances where station 11 take significantly longer than expected to complete its tasks.
- The standard deviation of the running difference in cycle time for Station 11 is 0.0108918, which is relatively high. This indicates that the cycle time for Station 11 varies a lot, suggesting inconsistency in its performance.

To address this bottleneck, it may be beneficial to investigate the operations at Station 11 to identify any issues or inefficiencies. Potential Solutions could include optimizing the station's processes, upgrading the equipment, or providing additional training to the operators.

Industrial Copilot Optimization



How can station 11 performance be improved ?



The performance of Station 11 can be improved by implementing the following measures:

1. **Optimize the Calibration Process**: The calibration process at Station 11 could be optimized to ensure that it is as efficient as possible. This could involve reviewing the current calibration procedures and identifying any areas where improvements could be made.
2. **Upgrade Equipment**: If the equipment at Station 11 is outdated or not functioning optimally, it may be beneficial to upgrade to newer, more efficient equipment. This could help to improve the speed and efficiency of the station.
3. **Provide Additional Training**: If the operators at Station 11 are not fully trained or are unfamiliar with the equipment, providing additional training could help to improve the station's performance. This could involve training on how to operate the equipment more efficiently, as well as training on how to quickly and effectively troubleshoot any issues that may arise.
4. **Regular maintenance**: Regular maintenance of the equipment at Station 11 could help to ensure that it is always in good working order and operating at maximum efficiency. This could involve regular checks and servicing of the equipment, as well as prompt repairs when necessary.

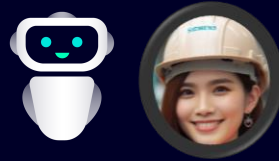
Supporting Observations:

- The average cycle time for Station 11 is 7.29 seconds which is higher than the expected maximum cycle time of 9.5 seconds. This suggests that there is room for improvement in the station's performance.
- The standard deviation of the running difference in cycle time for Station 11 is relatively high, indicating inconsistency in its performance. This could be addressed through the measures suggested above.

Industrial Copilot

A Journey

Leveraging Dynamic + Static Data



Optimization

Troubleshooting &
Repair

Shift Operations

Predictive Maintenance
Senseye

Challenge:

- Variety machines from different OEM, each with own history and niche.
- Vast amounts of connectivity and I/O to make sense of. Require fast response.

Opportunities

- Empower & Accelerate engineers at mid skill level to troubleshoot and debug.

Siemens Industrial Copilot:

- Siemens model understands semantic mapping to I/O and comprehends static data.

Industrial Copilot

Troubleshooting and Repair

I noticed the machine isn't running. Any idea why?



The machine is currently in an emergency stop state. This is indicated by the status code 30, which is present for the machine and all stations except Station 11. Stations 11 has a status code of 0, which means it is currently not assigned or active in the process.

Here's what you can do to resolve this:

1. Check to the emergency stop button has been activated, if so, reset it.
2. Inspect the machine for any visible defects or damages, if any are found, do not operate the machine until they are resolves.
3. Perform a visual inspection of the control panel.
4. Check all safety devices like emergency stop push button, protective doors, and covers.
5. If the issue persists, it might be necessary to consult with a technician or contact the machine's manufacturer for further assistance.

Remember, safety is paramount. Always ensure that the machine is safe to operate before attempting to restart it.

Industrial Copilot

Troubleshooting and Repair

What is causing the machine to stop ? Are there any error messages?



The machine has stopped due to an error at Station 15. The error message indicates that the robot controller is flashing with error code 6.

Here's what you can do to resolve this:

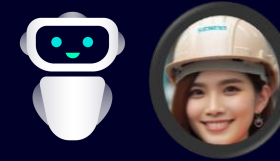
1. The error could be result of the robot operating at high speeds. Try reducing the robot's speed, acceleration or deceleration settings.
2. Monitor the robot's performance after adjusting these settings to see if the issue persists.
3. If the problem continues, it's advisable to consult with a technical or contact the robot's manufacturer for further assistance. They can diagnose the specific issue and provide guidance on potential component repairs or replacements.

Please remember to always follow safety guidelines when attempting to resolve machine errors.

Industrial Copilot

A Journey

Leveraging Dynamic + Static Data



Optimization

Troubleshooting &
Repair

Shift Operations

Predictive Maintenance
Senseye

Challenge:

- Attention on handover. Large scale of operation, many things can happen.
- Scale of data, small details are important.

Opportunities

- Enable engineers to focus on core task, helps with analyzing data and identify hidden pattern

Siemens Industrial Copilot:

- Siemens conditioned Copilot on maintenance data and scenarios.

Industrial Copilot

Shift Operations

What is the average time taken to produce a single item in the last shift?



The average time taken to produce a single item in the last shift was approximately 32.58 seconds.

Here are some additional details:

- The average cycle time for Station 1 was approximately 1.52 seconds.
- The average cycle time for Station 2 was approximately 2.51 seconds.
- The average cycle time for Station 3 was approximately 2.57 seconds.
- The average cycle time for Station 4 was approximately 3.88 seconds.
- The average cycle time for Station 5 was approximately 0.12 seconds.
- The average cycle time for Station 7 was approximately 6.5 seconds.
- The average cycle time for Station 15 was approximately 8.96 seconds.
- The average cycle time for Station 21 was approximately 6.52 seconds.

Please note that there was no cycle time recorded for Station 11 in the last shift.

Industrial Copilot

Shift Operations



Were there any error messages or downtime in the last shift ?



No, there were no error messages or downtime in the last shift.

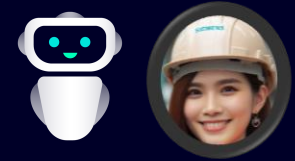
The machine code was consistently at 50, which indicates that the machine was in automatic mode and executing tasks autonomous according to predefined manufacturing procedures. Similarly, all the stations were either in automatic mode (status code 50) or idle in automatic mode (status code 15)., suggesting that there were ready for operation and did not encounter any errors or downtime.

Please note that these observations are based on the provided data and may have not accounted for unrecorded incidents or issues not reflected in the status codes.

Industrial Copilot

A Journey

Leveraging Dynamic + Static Data



Optimization

Troubleshooting &
Repair

Shift Operations

Predictive Maintenance
Senseye

Challenge:

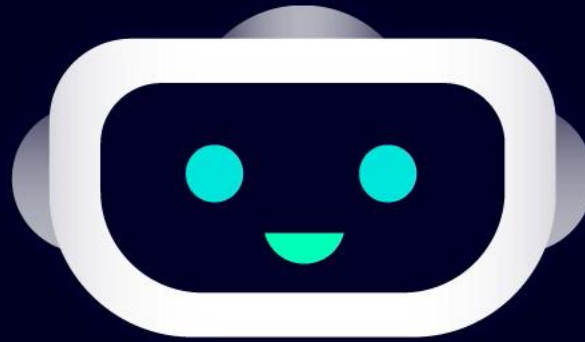
- Senseye is a powerful A.I tool, can we use Gen AI to augment operations? To better understand data ?

Opportunities

- Enable engineers to get verbal insights on past cases of incidents and correlation of cases.
- Fully unleash the power of PdM with Gen AI assistant.

Siemens Industrial Copilot:

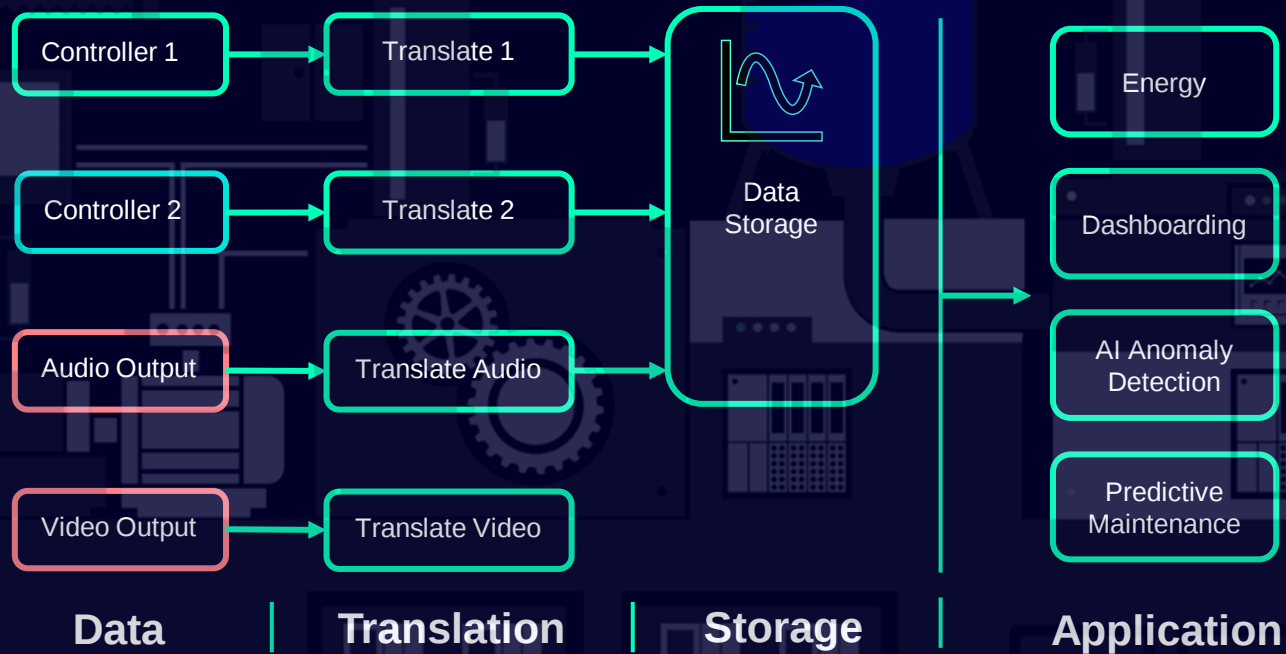
- Siemens conditioned Copilot on Senseye case data. Prompt tuning for task alignment.



**Do you need to anticipate
service or maintenance checks?**

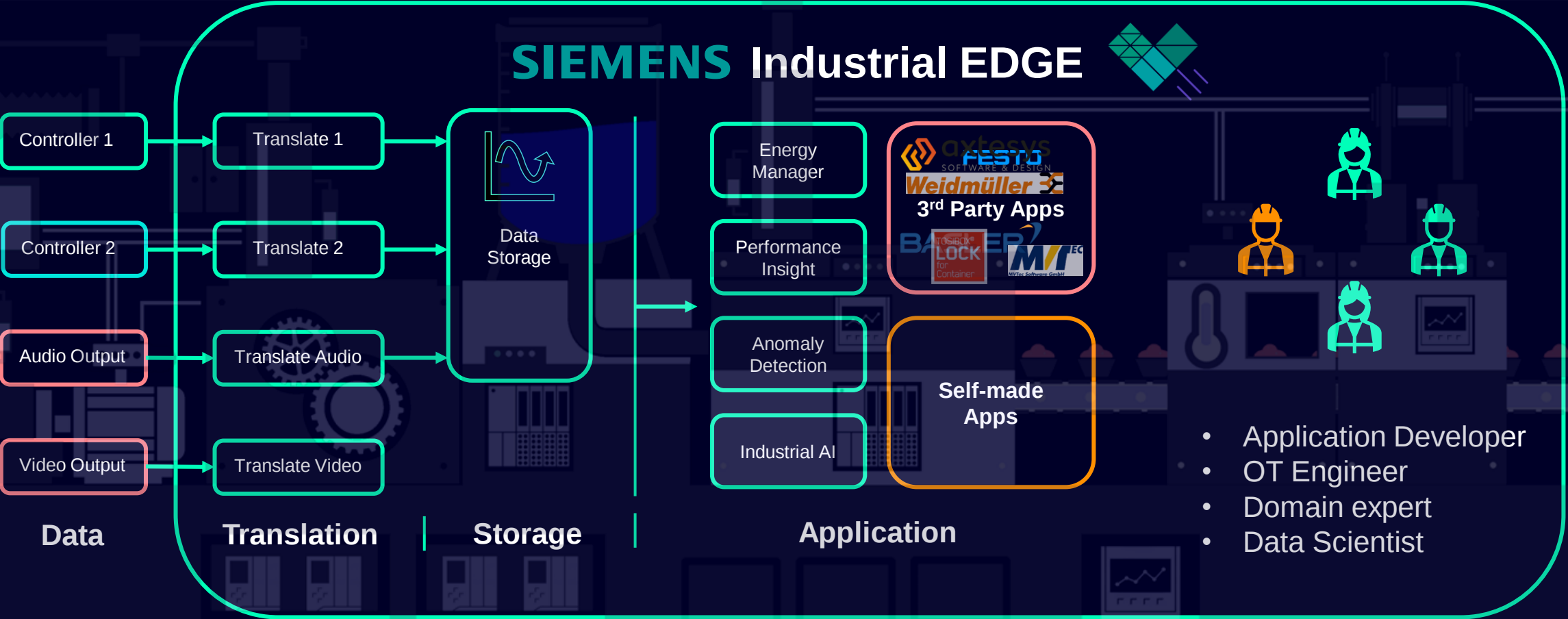
Accelerating A.I / ML With Industrial Edge

Multiplying the value of data



- Application Developer
- OT Engineer
- Domain expert
- Data Scientist

Multiplying the value of data through EDGE



The background is a teal-colored abstract composition. On the left, there are wavy, ribbon-like structures filled with binary code (0s and 1s). On the right, there is a complex network of white lines connecting various nodes, resembling a data or neural network. The overall aesthetic is high-tech and digital.

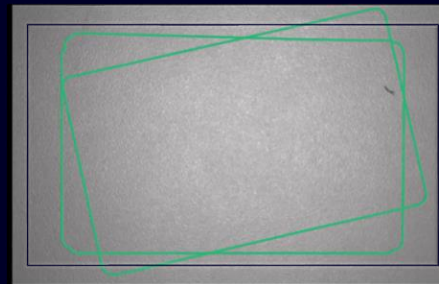
Anomaly Detection

Product Overview

Ease of Use – Guided operations, (Re)training interface, Model and Image comparison, ~20 image startup requirement, <1H turn around, Fine tuning visualization, Built in support system



Markup



Train

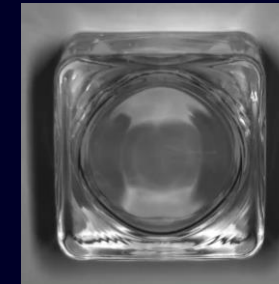
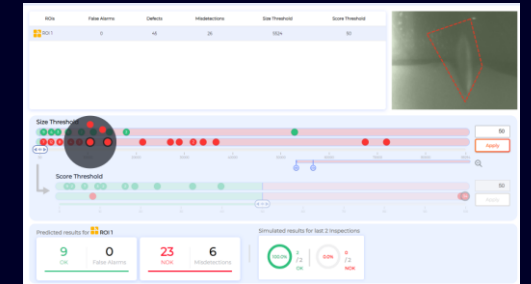


Image compare



Finetune

Expertise Included – Turnkey solution, Automated image optimization, Data outlier detection, Robust foundation model

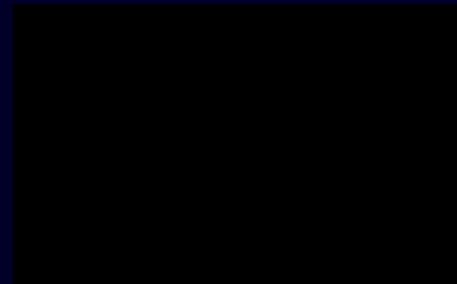
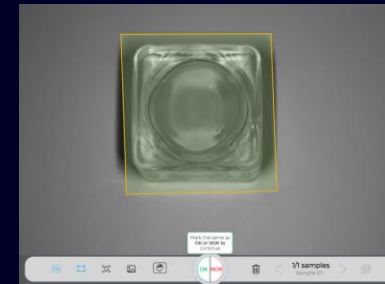
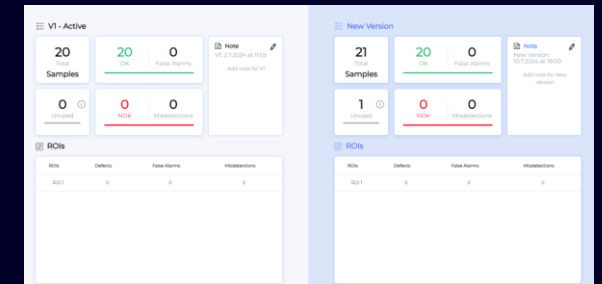


Image Optimization



Outlier detection



Model compare

External Options – Industrial communication ready, Bar/QR code workflow, Implementation across industries



Inference

Pushing Boundaries Journey with Siemens

*Gen AI is a **crucial Ingredient** for smart factories of the future. Unlock Possibilities.*

*Siemens as a partner for Innovation for **Industrial Grade A.I***



Contact

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Solution Consultant

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Presentation Topic:
**Gen AI In
Manufacturing**



Send us your Questions